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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/674,676	09/30/2003	Marc A. Najork	MSFT-2557/304882.01	4999
41505 7590 02/26/2008 WOODCOCK WASHBURN LLP (MICROSOFT CORPORATION) CIRA CENTRE, 12TH FLOOR 2929 ARCH STREET PHILADELPHIA, PA 19104-2891			EXAMINER STACE, BRENT S	
			ART UNIT 2161	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/674,676

Applicant(s)

NAJORK ET AL.

Examiner

BRENT STACE

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 January 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2,4-6,9,10,12,14-16,19,20,22-27,29,30,32-34,37,38 and 40-56 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,4-6,9,10,12,14-16,19,20,22-27,29,30,32-34,37,38 and 40-56 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 June 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Remarks

1. This communication is responsive to the amendment filed January 4th, 2008. Claims 1, 2, 4-6, 9, 10, 12, 14-16, 19, 20, 22-27, 29, 30, 32-34, 37, 38, and 40-56 are pending. In the amendment filed January 4th, 2008, Claims 1, 10, 12, 20, 22, 27, 29, 38, and 51 are amended, Claims 7, 8, 11, 17, 18, 21, 28, 35, and 36 are canceled, and Claims 1, 12, 22, 29, 38, 46, 51, 53, and 55 are independent. The examiner acknowledges that no new matter was introduced. This action is made FINAL.

Response to Arguments

2. The Applicant's arguments filed January 4th, 2008 with respect to Claims 1, 2, 4-12, 14-30, 32-38, and 40-56 have been considered but are not persuasive.

3. As to the applicant's arguments with respect to Claims 1, 12, 22, 29, 38, 46, 51, 53, and 55 for the prior art(s) allegedly not teaching "at least one entry from said allocation layer is local to its corresponding computing device of a plurality of computing devices and said at least one entry from said B-link tree is replicated among said plurality of computing devices," the examiner respectfully disagrees. Lomet, col. 2, lines 50-53 with Lomet, col. 5, lines 51-62 with Lomet, col. 2, lines 11-16 were used in rejecting these limitations. Lomet, col. 2, lines 50-53 with Lomet, col. 5, lines 51-62 teaches that the RLOGs can be made individually for each node (private/local) where a separate RLOG is associated with each node. Alternatively, nodes can also share

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RLOGs or each node can have multiple RLOGs. Lomet, col. 2, lines 11-16 teaches that data of a database (such as data in the B-link tree of Lehman) in Lomet can be distributed where “the same data can reside in the local memories of multiple nodes and can be updated from these nodes.” The same data residing in multiple nodes means that replication of the data occurred in some fashion. In the database art, distributing data across systems improves availability since multiple copies of the same data exist across different servers/nodes.

4. As to the applicant’s arguments with respect to Claims 22, 46, and 55 for the prior art(s) allegedly not teaching “a single log,” the examiner respectfully disagrees. Shaheen, col. 4, lines 62-66 teaches modification logs are at each participating server/computer.

5. As to the applicant’s arguments with respect to Claim 53 for the prior art(s) allegedly not teaching “truncating,” the examiner respectfully disagrees. As shown in similar Claims 12, Lomet, col. 14, lines 9-17 teaches this limitation in that Lomet truncates both the RLOG and the ALOG accordingly to the associated checkpoints.

6. The other claims argued merely because of a dependency on a previously argued claim(s) in the arguments presented to the examiner, filed January 4th, 2008, are moot in view of the examiner’s interpretation of the claims and art and are still considered rejected based on their respective rejections from a prior Office action (parts of recited again below).

Specification

7. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.
8. The disclosure is objected to because of the following informalities:
 - a. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). The applicant's have never shown the examiner where there is support in the specification for this subject matter. As such, correction of the following is required: the claimed subject matter of "after the data transaction commits" from Claim 1, 12, 29, 38, 44, and 51 (originally file in Claims 8, 18, 36, and 44) must be reflected in the specification. The examiner only sees support in the specification for the hypothetical limitation of "before the data transaction commits" (see paragraphs [0064]-[0067] of respective pages 20 and 21 of the present application). Most database management systems store log records into a persistent storage prior to committing a transaction so that the transaction for commission is not lost (the transaction can be recovered) if/when there is a system failure. According to the specification, the applicant's own invention does this, but the claims claim the reverse order. In fact, the applicant's own specification at paragraph [0064] (published paragraph [0084]), says that in order to have an effective and reliable system for logging (and recovery) the log entry

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for an operation to be committed must be written to the log prior to the operation being committed. Therefore it appears the Applicant is claiming a logging and recovery system that is not effective or reliable (based on the Applicant's own specification). Upon further review, the applicant's specification (p. 21, paragraph [0067]) exemplifies the intermediate storage as volatile storage (e.g. RAM, cache memory) and that log entries and corresponding updates are "written to the head of the log [] in persistent storage before updates [] have been committed." As such this is the interpretation that is used (not an interpretation regarding aging out log entries for archival purposes, since that does not apply to this application).

Appropriate correction is required

Claim Rejections - 35 USC § 112

9. In light of the applicant's respective arguments or respective amendments, the previous 35 USC § 112 rejections to the claims have been withdrawn.

Claim Rejections - 35 USC § 101

10. In light of the applicant's respective arguments or respective amendments, the previous 35 USC § 101 rejections to the claims have been withdrawn. However new rejections are warranted by the amendments to the claims.

11. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

12. Claims 10, 20, and 27 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

13. Claims 10, 20, and 27 are rejected under 35 U.S.C. 101 because it is not limited to tangible embodiments. In view of Applicant's disclosure, specification at page 12, lines 7-27, the claimed medium is not limited to tangible embodiments, instead being defined as including both tangible embodiments (e.g., computer storage medium of CDROM, magnetic disk storage, etc.) and intangible embodiments (e.g., communication media of modulated data signals, carrier waves, etc. (all forms of energy)). As such, the claim is not limited to statutory subject matter and is therefore non-statutory. The claim may be favorably considered if the words "computer readable medium" in the claims was replaced by "computer storage media."

Claim Rejections - 35 USC § 103

14. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

15. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation

under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

16. Claims 1, 2, 4-6, 9, 10, 12, 14-16, 19, 20, 29, 30, 32-34, 37, 38, 40-45, and 51-54 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,485,608 (Lomet et al.) in view of "Efficient Locking for Concurrent Operations on B-Trees" (Lehman et al.).

For **Claim 1**, Lomet teaches: "A method for logging while updating...via a plurality of data transactions, [Lomet, col. 7, lines 26-34] comprising:

- generating at least one log entry corresponding to a data transaction of the plurality of data transactions, the data transaction to be carried out on said B-link tree, [Lomet, col. 22, lines 25-30 with Lomet, col. 19, lines 35-37] wherein said at least one log entry includes at least one entry from an allocation layer [Lomet, col. 1, lines 65-67 with Lomet, col. 5, lines 38-44] and at least one entry from a B-link tree layer, [Lomet, col. 19, lines 35-37 with Lomet, col. 5, lines 38-44] wherein said at least one entry from said allocation layer is local to its corresponding computing device of a plurality of computing devices [Lomet, col. 2, lines 50-53 with Lomet, col. 5, lines 51-62] and said at least one entry from said B-link tree is replicated among said plurality of computing devices; [Lomet, col. 2, lines 11-16]

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- storing said at least one log entry in an intermediate memory previous to storing said at least one log entry in a log; [Lomet, col. 7, lines 26-34 with Lomet, col. 19, lines 35-37] and
- storing said at least one log entry into the log, wherein said at least one log entry is moved from intermediate memory to the log after the data transaction commits" [Lomet, col. 19, lines 35-37 with Lomet, col. 16, lines 23-25].

Lomet discloses the above limitations but does not expressly teach:

- "...a B-link tree."

With respect to Claim 1, an analogous art, Lehman, teaches:

- "...a B-link tree" [Lehman, p. 657, section 3.3].

It would have been obvious to one of ordinary skill in the art at the time of invention to combine Lehman with Lomet because both inventions are directed towards storing information in a database.

Lehman's invention would have been expected to successfully work well with Lomet's invention because both inventions use databases. Lomet discloses methods and an apparatus for updating information in a computer system using logs and state identifiers comprising Rlogs, Ulogs and Alogs, however Lomet does not expressly disclose the use of a B-link-tree to store the data in the database of Lomet. Lehman discloses efficient locking for concurrent operations on B-trees comprising a B-link-tree.

It would have been obvious to one of ordinary skill in the art at the time of invention to take the b-link-tree from Lehman and install it into the invention of Lomet,

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thereby offering the obvious advantage of a guaranteed small (average) search, insertion, and deletion time for the database of Lomet.

Claim 2 can be mapped to Lomet (as modified by Lehman) as follows: "A method according to claim 1, further including periodically truncating the log" [Lomet, cols. 11-12, lines 60-12].

Claim 4 can be mapped to Lomet (as modified by Lehman) as follows: "A method according to claim 1, further including discarding said at least one log entry from the log when the data transaction has been carried out on said B-link tree" [Lomet, col. 14, lines 9-12].

Claim 5 can be mapped to Lomet (as modified by Lehman) as follows: "A method according to claim 1, wherein said storing includes storing said at least one log entry into the log before the data transaction is carried out on said B-link tree" [Lomet, col. 7, lines 26-34].

Claim 6 can be mapped to Lomet (as modified by Lehman) as follows: "A method according to claim 1, further including caching data of said data transaction before said data transaction is carried out on said B-link tree" [Lomet, col. 7, lines 26-34 with Lomet, col. 5, lines 1-11].

Claim 9 can be mapped to Lomet (as modified by Lehman) as follows: "A method according to claim 1, further including maintaining a log sequence number with each of said at least one log entry, uniquely identifying said at least one log entry" [Lomet, col. 5, lines 44-52].

Claim 10 encompasses substantially the same scope of the invention as that of Claim 1, in addition to computer readable medium and some instructions for performing the method steps of Claim 1. Therefore, Claim 10 is rejected for the same reasons as stated above with respect to Claim 1.

For **Claim 12**, Lomet teaches: "A method for logging while updating via a plurality of data transactions, [Lomet, col. 7, lines 26-34] comprising:

- generating at least one log entry corresponding to a data transaction of the plurality of data transactions, the data transaction to be carried out on said B-link tree, [Lomet, col. 19, lines 35-37 with Lomet, col. 19, lines 45-51] wherein said at least one log entry includes at least one entry from an allocation layer [Lomet, col. 1, lines 65-67 with Lomet, col. 5, lines 38-44] and at least one entry from a B-link tree layer, [Lomet, col. 19, lines 35-37 with Lomet, col. 5, lines 38-44] wherein said at least one entry from said allocation layer is local to its corresponding computing device of a plurality of computing devices [Lomet, col. 2, lines 50-53 with Lomet, col. 5, lines 51-62] and said at least one entry from said B-link tree is replicated among said plurality of computing devices; [Lomet, col. 2, lines 11-16]
- storing said at least one log entry in an intermediate memory previous to storing said at least one log entry in a finite log; [Lomet, col. 7, lines 26-34 with Lomet, col. 19, lines 35-37]

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- storing said at least one log entry into the finite log, wherein said at least one log entry is moved from the intermediate memory to the finite log after the data transaction commits; [Lomet, col. 19, lines 35-37 with Lomet, col. 16, lines 23-25]
- periodically flushing data corresponding to data transactions represented by the finite log to persistent storage; [Lomet, col. 14, lines 9-17] and
- truncating said finite log in coordination with said flushing" [Lomet, col. 14, lines 9-17].

Lomet discloses the above limitations but does not expressly teach:

- "a B-link tree."

With respect to Claim 12, an analogous art, Lehman, teaches:

- "a B-link tree" [Lehman, p. 657, section 3.3].

It would have been obvious to one of ordinary skill in the art at the time of invention to combine Lehman with Lomet because both inventions are directed towards storing information in a database.

Lehman's invention would have been expected to successfully work well with Lomet's invention because both inventions use databases. Lomet discloses methods and an apparatus for updating information in a computer system using logs and state identifiers comprising Rlogs, Ulogs and Alogs, however Lomet does not expressly disclose the use of a B-link-tree to store the data in the database of Lomet. Lehman discloses efficient locking for concurrent operations on B-trees comprising a B-link-tree.

It would have been obvious to one of ordinary skill in the art at the time of invention to take the b-link-tree from Lehman and install it into the invention of Lomet,

thereby offering the obvious advantage of a guaranteed small (average) search, insertion, and deletion time for the database of Lomet.

Claim 14 can be mapped to Lomet (as modified by Lehman) as follows: "A method according to claim 12, further including discarding said at least one log entry from the finite log when the data transaction has been carried out on said B-link tree" [Lomet, col. 14, lines 9-17].

Claim 15 can be mapped to Lomet (as modified by Lehman) as follows: "A method according to claim 12, wherein said storing includes storing said at least one log entry into the finite log before the data transaction is carried out on said B-link tree" [Lomet, col. 7, lines 26-34].

Claim 16 can be mapped to Lomet (as modified by Lehman) as follows: "A method according to claim 1, further including caching data of said data transaction before said data transaction is carried out on said B-link tree" [Lomet, col. 7, lines 26-34 with Lomet, col. 5, lines 1-11].

Claim 19 can be mapped to Lomet (as modified by Lehman) as follows: "A method according to claim 12, further including maintaining a log sequence number with each of said at least one log entry, uniquely identifying said at least one log entry" [Lomet, col. 5, lines 44-52].

Claim 20 encompasses substantially the same scope of the invention as that of Claim 12, in addition to computer readable medium and some instructions for performing the method steps of Claim 12. Therefore, Claim 20 is rejected for the same reasons as stated above with respect to Claim 12.

Claims 29 and 30 encompass substantially the same scope of the invention as that of Claims 1 and 2, respectfully, in addition to a server and some actions for performing the method steps of Claims 1 and 2, respectfully. Therefore, Claims 29 and 30 are rejected for the same reasons as stated above with respect to Claims 1 and 2, respectfully.

Claims 32-34, and 37 encompass substantially the same scope of the invention as that of Claims 4-6 and 9, respectfully, in addition to a server and some actions for performing the method steps of Claims 4-6 and 9, respectfully. Therefore, Claims 32-34, and 37 are rejected for the same reasons as stated above with respect to Claims 4-6 and 9, respectfully.

Claim 38 encompasses substantially the same scope of the invention as that of Claim 12, in addition to a server and some objects for performing the method steps of Claim 12. Therefore, Claim 38 is rejected for the same reasons as stated above with respect to Claim 12.

Claims 40-42 encompass substantially the same scope of the invention as that of Claims 14-16, respectfully, in addition to a server and some objects for performing the method steps of Claims 14-16, respectfully. Therefore, Claims 40-42 are rejected for the same reasons as stated above with respect to Claims 14-16, respectfully.

Claim 43 can be mapped to Lomet (as modified by Lehman) as follows: "A server according to claim 38, further including storing said at least one log entry in an intermediate memory previous to storing said at least one log entry in the finite storage log" [Lomet, col. 7, lines 26-34 with Lomet, col. 19, lines 35-37].

Claim 44 can be mapped to Lomet (as modified by Lehman) as follows: "A server according to claim 43, wherein said at least one log entry is moved from intermediate memory to the finite storage log after the data transaction commits" [Lomet, col. 16, lines 23-25].

Claim 45 encompasses substantially the same scope of the invention as that of Claim 19, in addition to a server and some objects for performing the method steps of Claim 19. Therefore, Claim 45 is rejected for the same reasons as stated above with respect to Claim 19.

Claims 51 and 52 encompass substantially the same scope of the invention as that of Claims 1 and 2, respectfully, in addition to a computing device and some means for performing the method steps of Claims 1 and 2, respectfully. Therefore, Claims 51 and 52 are rejected for the same reasons as stated above with respect to Claims 1 and 2, respectfully.

Claims 53 and 54 encompass substantially the same scope of the invention as that of Claims 12 and 14, respectfully, in addition to a computing device and some means for performing the method steps of Claims 12 and 14, respectfully. Therefore, Claims 53 and 54 are rejected for the same reasons as stated above with respect to Claims 12 and 14, respectfully.

17. Claims 22, 23, 26, 27, 46, 47, 50, 55 and 56 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,485,608 (Lomet et al.) in view of U.S. Patent No. 5,434,994 (Shaheen et al.).

For **Claim 22**, Lomet teaches: "A method for logging while updating a data structure via a plurality of data transactions, [Lomet, col. 7, lines 26-34] comprising:

- ...generating at least one log entry corresponding to a data transaction of the plurality of data transactions, the data transaction to be carried out on said data structure; [Lomet, col. 22, lines 25-30 with Lomet, col. 19, lines 35-37] and
- where the log is partitioned into an upper layer and an allocation layer, [Lomet, col. 5, lines 31-45 with Lomet, Fig. 3] ... wherein the single log includes log entries from both the upper layer and allocation layer [Lomet, col. 5, lines 15-22 with Lomet, Fig. 3]...wherein said entries from said allocation layer are local to its corresponding computing device of a plurality of computing devices [Lomet, col. 2, lines 50-53 with Lomet, col. 5, lines 51-62] and said entries from said upper layer are replicated among said plurality of computing devices" [Lomet, col. 5, lines 51-62 with Lomet, col. 2, lines 11-16].

Lomet discloses the above limitations but does not expressly teach:

- "...replicating updates to the data structure to a first server location and a second server location;
- maintaining a single log...at each of said first and second server locations."

With respect to Claim 22, an analogous art, Shaheen, teaches:

- "...replicating updates to the data structure to a first server location and a second server location; [Shaheen, col. 7, lines 50-55]
- maintaining a single log...at each of said first and second server locations" [Shaheen, col. 4, lines 62-66].

It would have been obvious to one of ordinary skill in the art at the time of invention to combine Shaheen with Lomet because both inventions are directed towards recovering data upon failure.

Shaheen's invention would have been expected to successfully work well with Lomet's invention because both inventions use computers using logs. Lomet discloses methods and an apparatus for updating information in a computer system using logs and state identifiers comprising Rlogs, Ulogs and Alogs, however Lomet does not expressly disclose replicating data on multiple servers, or maintaining a single log on those servers. Shaheen discloses a system and method for maintaining replicated data coherency in a data processing system comprising replicating data and logs across multiple servers.

It would have been obvious to one of ordinary skill in the art at the time of invention to take the replication of data and logs across multiple servers from Shaheen and install it into the invention of Lomet, thereby offering the obvious advantage of making Lomet distributed to increase the availability and reliability of distributed systems of Lomet.

Claim 23 can be mapped to Lomet (as modified by Shaheen) as follows: "A method according to claim 22, further including recovering the data structure after a failure by performing parallel recovery operations by each of said first and second server locations" [Shaheen, col. 4, lines 60-66 with Shaheen, col. 7, lines 49-57].

Claim 26 can be mapped to Lomet (as modified by Shaheen) as follows: "A method according to claim 22, wherein the allocator layer handles at least one of (A) an

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allocate disk space operation, (B) a deallocate disk space operation, (C) a read from the allocated disk space operation and (D) a write to the allocated disk space operation”

[Lomet, col. 5, lines 31-38].

Claim 27 encompasses substantially the same scope of the invention as that of Claim 22, in addition to computer readable medium and some instructions for performing the method steps of Claim 22. Therefore, Claim 27 is rejected for the same reasons as stated above with respect to Claim 22.

Claims 46, 47, and 50 encompass substantially the same scope of the invention as that of Claims 22, 23, and 26, respectfully, in addition to a server and some objects for performing the method steps of Claims 22, 23, and 26, respectfully. Therefore, Claims 46, 47, and 50 are rejected for the same reasons as stated above with respect to Claims 22, 23, and 26, respectfully.

Claims 55 and 56 encompass substantially the same scope of the invention as that of Claims 22 and 23, respectfully, in addition to a computing device and some means for performing the method steps of Claims 22 and 23, respectfully. Therefore, Claims 55 and 56 are rejected for the same reasons as stated above with respect to Claims 22 and 23, respectfully. Additionally, Claim 55 recites “wherein said entries from the upper layer are replicated to both said first server and said second server, while said entries from said allocation layer are stored locally on said first server and said second server” which is taught by [Lomet, col. 2, lines 50-53 with Lomet, col. 5, lines 51-62 with Lomet, col. 2, lines 11-16] (similar to the above claims).

18. Claims 24, 25, 48, and 49 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,485,608 (Lomet et al.) in view of U.S. Patent No. 5,434,994 (Shaheen et al.), further in view of Efficient Locking for Concurrent Operations on B-Trees (Lehman et al.).

For **Claim 24**, Lomet (as modified by Shaheen) teaches: "A method according to claim 22."

Lomet (as modified by Shaheen) discloses the above limitation but does not expressly teach: "wherein said data structure is a B-link tree."

With respect to Claim 24, an analogous art, Lehman, teaches: "wherein said data structure is a B-link tree" [Lehman, p. 657, section 3.3].

It would have been obvious to one of ordinary skill in the art at the time of invention to combine Lehman with Lomet (as modified by Shaheen) because both inventions are directed towards storing information in a database.

Lehman's invention would have been expected to successfully work well with Lomet (as modified by Shaheen)'s invention because both inventions use databases. Lomet (as modified by Shaheen) discloses methods and an apparatus for updating information in a computer system using logs and state identifiers comprising Rlogs, Ulogs and Alogs, however Lomet (as modified by Shaheen) does not expressly disclose the use of a B-link-tree to store the data in the database of Lomet (as modified by Shaheen). Lehman discloses efficient locking for concurrent operations on B-trees comprising a B-link-tree.

It would have been obvious to one of ordinary skill in the art at the time of invention to take the b-link-tree from Lehman and install it into the invention of Lomet (as modified by Shaheen), thereby offering the obvious advantage of a guaranteed small (average) search, insertion, and deletion time for the database of Lomet (as modified by Shaheen).

Claim 25 can be mapped to Lomet (as modified by Shaheen) as follows: "A method according to claim 24, wherein the upper layer is a B-link tree layer that handles B-link tree operations" [Lomet, col. 5, lines 39-44].

Claims 48 and 49 encompass substantially the same scope of the invention as that of Claims 24 and 25, respectfully, in addition to a server and some objects for performing the method steps of Claims 24 and 25, respectfully. Therefore, Claims 48 and 49 are rejected for the same reasons as stated above with respect to Claims 24 and 25, respectfully.

19. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

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the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

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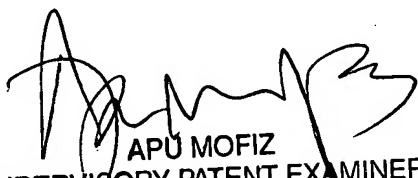
Conclusion

20. Any inquiry concerning this communication or earlier communications from the examiner should be directed to BRENT STACE whose telephone number is (571)272-8372 and fax number is 571-273-8372. The examiner can normally be reached on M-F 9am-5:30pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Apu M. Mofiz can be reached on 571-272-4080. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/B.S./ Examiner, Art Unit 2161


APU MOFIZ
SUPERVISORY PATENT EXAMINER